



US005734513A

**United States Patent** [19]

Wang et al.

[11] **Patent Number:** 5,734,513[45] **Date of Patent:** Mar. 31, 1998[54] **ELECTRONIC APPARATUS WITH A FOLDABLE DISPLAY**

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[21] Appl. No.: **627,293**

[22] Filed: **Apr. 3, 1996**

[51] Int. Cl.<sup>6</sup> ..... **G02B 3/08; G02B 27/22; G09G 3/00**

[52] U.S. Cl. .... **359/742; 359/472; 359/474; 345/32**

[58] Field of Search ..... **345/32; 348/818; 358/335; 359/474, 472, 477, 742**

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[57] **ABSTRACT**

A foldable screen display for displaying screen images is disclosed which comprises: (a) at least two sub-displays; (b) a hinging member for pivotally connecting the sub-displays together on a side-by-side manner; (c) a magnifying optical element provided on top of each of the sub-displays, the magnifying optical element providing a magnifying power of between about 1.05 and about 1.3 so as to cause images displayed on the sub-displays to be perceived by a user as if they were from a single display; and (d) a membrane covering both of the sub-displays and the hinging member, the membrane being made of a transparent and resilient material. In a preferred embodiment, the magnifying optical element is a zone plate type magnifying optical element and is constructed to provide a magnifying power approximately equalling to one plus the ratio between the width of the hinging member and the width of sub-display. The foldable screen display provides the advantages of being able to reduce the size of the display without compromising user's desire for maximum viewing comfort; therefore, it is an excellent device for use in making personal digital assistants, electronic books, electronic Rolodex®, pen-based computers, portable TV, etc.

**20 Claims, 5 Drawing Sheets**